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Pima Community College Planning Grant
For
Autonomous Intelligent Network of Systems (AINS)
Science, Mathematics & Engineering Education Center

Technical Report – Final

Award Number N00014-03-1-0844
Mod. # A00005

Background

The Pima Community College (PCC) planning grant was funded to support the nonprofit Technology Development Research Development (TDRI) AIMS Science, Math and Engineering Education Center to be located in the Tohono O'Odham Nation's San Xavier Business Park. The Center was to be funded by the Department of Defense, Office of Naval Research. The Technology Development Research Institute Center's objectives were to advance the Office of Naval Research (ONR) technologies and, to improve exposure and participation in science, math and engineering (SME) education by under-represented minorities with focus on Native American high school students and college age students' interest in pursuing SME associate, bachelor and advanced degrees. The Center also was to provide faculty from PCC and the Tohono O'Odham Community College exposure to and participation in the TDRI Center's new technologies.

Since the ONR TDRI AIMS Science, Math and Engineering Education Center was not funded beyond a planning grant which the TDRI had received, the PCC planning grant was modified. The modification reallocated dollars originally supporting college positions and marketing costs to support TDRI activities, to focusing on underrepresented minority students through recruitment activities, scholarships, summer academies and externships all supporting the concept of encouraging students' participation in science, math and engineering.

Both PCC and TDRI were requested by the ONR program manager to require initial high school and community college scholarship candidates to participate in the National ONR Autonomous Intelligent Network of Systems Conference held in Tucson, August 2003.

Project Description

Purpose: This project provided activities for over 1100 students to enhance the minority, particularly Native American, high school and college age students' interest in pursuing science, mathematics and engineering associate, bachelor and advanced degrees, through outreach and recruitment activities, scholarships to qualified students, summer

academies and learning academies, support services such as tutoring, and student externships with the University of Southern California Biomimetric MicroElectronic Systems - Engineering Research Center. This project also provided high school and community college faculty exposure to new technologies particularly in unmanned vehicles by participating in the National ONR Autonomous Intelligent Network of Systems Conference held in Tucson, Arizona, August 2003.

Outcomes

Scholarships: Through partnerships with the Pascua Yaqui Tribe and Tohono O'Odham Nation and the resources of the College:

Exactly 310 Native American and underrepresented minority community college students/community college bound students were contacted by letter with follow-up directly in person or via telephone; student assessments and academic records for 75 students were reviewed and scheduled for interviews; 25 were selected to participate in a second interview. Ten attended the Office of Naval Research AINS Principle Investigator Conference held August 18-20 in Tucson, Arizona.

Fifty (50) high school students were contacted; 24 were extended an invitation to participate in the conference; 17 attended the AINS conference.

Five (5) Pima Community College faculty and eight (8) PCC staff participated in the conference.

The initial final five (5) selected for scholarships were interviewed by telephone and selected by AINS principal investigators representating MIT, UCLA, USC and UC-Berkeley as well as Linda Andrews of Pima Community College and Sally Fernandez of TDRI. Subsequently, one student dropped out for personal reasons. In year two, three more students were awarded scholarships. All seven (7) students are minorities and are working and going to school; five of the seven scholarship recipients are Native American. One Native American scholarship student graduated from Pima Community College and is attending Texas Tech University; four students were taking courses at Pima Community College and the University of Arizona simultaneously and are on track to graduate from Pima and/or the University of Arizona in 2007. One student is completing his coursework at Pima and plans to complete the engineering program at a university.

University Externships: A total of four (4) of the scholarship students participated in one of the two summer externships, one offered in 2004 and one in 2005. Externships were conducted at the University of Southern California Biomimetric MicroElectronic Systems Engineering Research Center with the Center covering the cost for all four students out of a National Science Foundation Grant. Externships were two weeks in duration; students toured the campus, and experienced campus life and living in university housing. Students participated in selected workshops and research-oriented

meetings, observed the research in progress for several research projects and met with the PhD candidates responsible. Each student also was assigned a mentor graduate student. Feedback from the PCC students was very positive and enthusiastic, and for the first time some gave consideration to research as a career option. Students were impressed by the high level of research being conducted at BMES-ERC and were grateful for their opportunity to participate in the externship.

Summer Academies: Fifty (50) high school students participated in four (4) Summer Academies. Summer Academies were conducted for minority high school students entering 10th, 11th and 12th grades in the Fall 2004. Recruitment goals were achieved with Native American students representing the near majority of students enrolled. Two engineering academies were offered by the University of Arizona Minority Engineering Program. Each one-week academy covered working in teams on projects, taking those projects from design utilizing SolidWorks CAD through rapid prototyping and incorporating wind tunnel testing of the products and other quality control measures. Final products were evaluated and awards given to the teams. Parents and family were invited to attend the awards ceremony. Two one-week information technology academies introduced the high school students to the basics of computer graphics programming. Students learned new software and techniques of project design. Students learned by creating their own game program and worked through the design process through testing to final presentation to the group as a whole. Students received a certificate of completion.

Learning Academies: Twenty (20) students participated in Learning Academies which enabled them to receive scholarships for their first semester of community college courses. A Developmental Math Academy helped students with deficiencies in math to improve their math skills and successfully complete assessment testing for entrance into Pima Community College. A College Readiness Academy prepared Pima County Adult Education student graduates for college through course work in Time Management, How to Use the Library, How to Study, and in Test Taking among the topics covered.

Career Awareness and Recruitment Activities: Activities included PCC participation in the 2004 Industry Cluster EXPO where some 300 high school students were exposed to careers in aerospace; high tech manufacturing; information technology; environmental, bio and life sciences; plastics and advanced composites and information about the AINS program and working for the Department of Defense.

PCC participated with the Southern Arizona Chapter of Engineering in February of 2004, 2005, and 2006 to celebrate National Engineering Week. Each year approximately 150 middle school and high school students actively participated in "hands on" projects offered at each booth. Students also were given information on how engineering skills impact product development and learned about the spectrum of opportunities in the field of engineering, from building missiles at Raytheon to civil engineering to biosciences to learning about the programs offered by the Armed Services and programs at Pima Community College.

The College also participated in career and recruitment events on the Tohono O'Odham and Pascua Yaqui Reservations to inform Native American middle and high school students about the programs at the College and careers in the sciences and in engineering.

Annually since 2003, Pima Community College West Campus has hosted a Career Day for parents and prospective students focusing on careers in high technology and engineering. Underrepresented minorities are recruited by outreach coordinators assigned to each of the six campuses. This event was implemented in 2003 and utilized to reach prospective students for the planning grant activities.

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14. ABSTRACT

This project provided activities for over 1100 students to enhance the minority, particularly Native American, high school and college age students' interest in pursuing science, mathematics, and engineering associate, bachelor and advanced degrees, through outreach and recruitment activities, scholarships to qualified students, summer academies and learning academies, support services such as tutoring, student externships with the University of Southern California Biomimetric MicroElcetronic Systems - Engineering Research Center. This project also provided high school and community college faculty exposure to new technologies particularly unmanned vehicles by participating in the National ONR Autonomous Intelligent Network Systems Conference held in Tucson, Arizona, August 2003.

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